

What is claimed is:

1. A data forwarding controller for performing data forwarding control via a network, comprising:

a plurality of data input/output ports;

5 means for storing a MAC learning table in which a MAC address of data for forwarding is associated with an output port; and

a control section for updating said MAC learning table, wherein said control section is configured to

10 set, for a mobile node, in said MAC learning table, a plurality of entries associating different output ports with a MAC address of said mobile node, and output data addressed to said MAC address of said mobile node received via said network, to said plurality of output ports in parallel, based
15 on said plurality of entries set in said MAC learning table.

2. The data forwarding controller according to claim 1, wherein

said control section is configured to

20 set a plurality of entries respectively setting a port to which a current access point of said mobile node is connected and port(s) to which one or more next access points of said mobile node is connected, as output ports corresponding to said MAC address of said mobile node, and
25 output said data addressed to said MAC address of said mobile node received via said network to said plurality of output ports set in said plurality of entries in parallel.

3. The data forwarding controller according to claim 1,

30 wherein

said control section is configured to

set an entry in said MAC learning table as an additional entry based on a MAC address of a next access point contained in a handover start message received from said mobile node, wherein said additional entry sets a port to which said next access point is connected, as an output port corresponding to said MAC address of said mobile node, and

output said data addressed to said MAC address of said mobile node received via said network in parallel, to said output ports listed in said plurality of entries as to said MAC address of said mobile node set in said MAC learning table, wherein said output ports are a plurality of ports to which a current access point and said next access point of said mobile node are connected.

15 4. The data forwarding controller according to claim 3, wherein

said control section is configured to transmit a handover setting completion message to said mobile node from which said handover start message is received, 20 on condition that said setting of said additional entry in said MAC learning table based on said handover start message is completed.

25 5. The data forwarding controller according to claim 1, wherein

said control section is configured to delete, based on a MAC address of an old access point contained in a handover end message received from said mobile node, an entry setting a port to which said old access point 30 is connected, as an output port corresponding to said MAC address of said mobile node, from said MAC learning table.

6. The data forwarding controller according to claim 1,
wherein

5 said control section is configured to
receive data from access points performing data forward
to said mobile node, and set another data corresponding to
output ports for MAC addresses of said access points, based
on said data.

10 7. A communication terminal apparatus of a mobile type
which performs data transmission/reception via a network and
which changes access points based on data receiving
conditions, wherein

15 said communication terminal apparatus is configured to
acquire a MAC address of a next access point to which said
communication terminal apparatus is scheduled to be connected
next, and broadcast a handover start message containing said
acquired MAC address of said next access point, and

20 perform a handover process on condition that said
communication terminal apparatus receives a handover setting
completion message from a data forwarding controller as a
response to said handover start message.

25 8. The communication terminal apparatus according to
claim 7, wherein said communication terminal apparatus is
configured to

30 perform a background scanning process by which all
wireless channels are periodically scanned, to acquire and
store a source MAC address of a received beacon as said MAC
address of said next access point.

9. The communication terminal apparatus according to claim 7, wherein said communication terminal apparatus is configured to

re-transmit said handover start message for a time period from transmission of said handover start message to reception of said handover setting completion message.

10. The communication terminal apparatus according to claim 7, wherein said communication terminal apparatus is configured to

transmit to said data forwarding controller from which said handover setting completion message is received or broadcast, a handover end message containing a MAC address of an old access point which said communication terminal apparatus has disconnected, after said handover process has been performed.

11. A data communication system comprising a communication terminal apparatus of a mobile type which performs data transmission/reception via a network and which changes access points based on data receiving conditions, and a data forwarding controller which performs data forwarding control via said network, wherein

said communication terminal apparatus is configured to acquire a MAC address of a next access point to which said communication terminal apparatus is scheduled to be connected next, and broadcast a handover start message containing said MAC address of said acquired next access point;

30 said data forwarding controller is configured to set an entry in a MAC learning table as an additional

entry based on said MAC address of said next access point contained in said handover start message received from said communication terminal apparatus, wherein said entry sets a port to which said next access point is connected, as an output 5 port corresponding to a MAC address of said communication terminal apparatus; and

output data addressed to said MAC address of said communication terminal apparatus received via said network, in parallel to output ports listed in a plurality of entries 10 as to said MAC address of said communication terminal apparatus set in said MAC learning table, wherein said output ports are a plurality of ports to which a current access point and said next access point of said communication terminal apparatus are connected.

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12. The data communication system according to claim 11, wherein said communication terminal apparatus is configured to

perform a handover process on condition that said 20 communication terminal apparatus receives a handover setting completion message from said data forwarding controller as a response to said handover start message.

13. The data communication system according to claim 11, 25 wherein said data forwarding controller is configured to transmit a handover setting completion message to said communication terminal apparatus from which said handover start message is received, on condition that said setting of said additional entry in said MAC learning table based on said 30 handover start message is completed.

14. The data communication system according to claim 11, wherein said data forwarding controller is configured to delete, based on a MAC address of an old access point contained in a handover end message received from said 5 communication terminal apparatus, an entry setting a port to which said old access point is connected, as an output port corresponding to said MAC address of said communication terminal apparatus, from said MAC learning table.
- 10 15. A method of controlling data forwarding via a network, comprising the steps of:
- (a) setting, for a mobile node, in a MAC learning table in which a MAC address of data for forwarding is associated with an output port, a plurality of entries associating 15 different output ports with a MAC address of said mobile node; and
 - (b) outputting data addressed to said MAC address of said mobile node received via said network, to said plurality of output ports in parallel based on said plurality of entries set in said MAC learning table.
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16. The method according to claim 15, wherein
- said step (a) comprises
 - setting a plurality of entries respectively setting a 25 port to which a current access point of said mobile node is connected and port(s) to which one or more next access points of said mobile node is connected, as output ports corresponding to said MAC address of said mobile node; and
 - said step (b) comprises
 - outputting said data addressed to said MAC address of said mobile node received via said network, to said plurality
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of output ports set in said plurality of entries in parallel.

17. The method according to claim 15, wherein
said step (a) comprises

5 setting an entry in said MAC learning table as an additional entry based on a MAC address of a next access point contained in a handover start message received from said mobile node, wherein said additional entry sets a port to which said next access point is connected, as an output port
10 corresponding to said MAC address of said mobile node; and
said step (b) comprises

outputting said data addressed to said MAC address of said mobile node received via said network, in parallel to said output ports listed in said plurality of entries as to
15 said MAC address of said mobile node set in said MAC learning table, wherein said output ports are a plurality of ports to which a current access point and said next access point of said mobile node are connected.

20 18. The method according to claim 17, further comprising
the step of:

transmitting a handover setting completion message to said mobile node from which said handover start message is received, on condition that said setting of said additional
25 entry in said MAC learning table based on said handover start message is completed.

19. The method according to claim 15, further comprising
the step of:

30 deleting, based on a MAC address of an old access point contained in a handover end message received from said mobile

node, an entry setting a port to which said old access point is connected, as an output port corresponding to said MAC address of said mobile node, from said MAC learning table.

5 20. The method according to claim 15, further comprising the step of:

receiving data from access points performing data forwarding to said mobile node, and setting another data corresponding to output ports for MAC addresses of said access
10 points in said MAC learning table, based on said data.

21. A method of performing a handover process on a communication terminal apparatus of a mobile type which performs data transmission/reception via a network and which
15 changes access points based on data receiving conditions,

said method comprising the steps of:

(a) acquiring a MAC address of a next access point to which said communication terminal apparatus is scheduled to be connected next;

20 (b) broadcasting a handover start message containing said acquired MAC address of said next access point; and

(c) performing said handover process on condition that a handover setting completion message is received from a data forwarding controller as a response to said handover start
25 message.

22. The method according to claim 21, wherein
said step (a) comprises

30 performing a background scanning process by which all wireless channels are periodically scanned, to acquire and store a source MAC address of a received beacon as said MAC

address of said next access point.

23. The method according to claim 21, further comprising the step of:

5 re-transmitting said handover start message for a time period from transmission of said handover start message to reception of said handover setting completion message.

24. The method according to claim 21, further comprising 10 the step of:

transmitting to said data forwarding controller from which said handover setting completion message is received or broadcasting, a handover end message containing a MAC address of an old access point which said communication 15 terminal apparatus has disconnected, after said handover process has been performed.

25. A data communication method comprising a communication terminal apparatus of a mobile type which performs data 20 transmission/reception via a network and which changes access points based on data receiving conditions, and a data forwarding controller which performs data forwarding control via said network, wherein

said communication terminal apparatus
25 acquires a MAC address of a next access point to which said communication terminal apparatus is scheduled to be connected next, and broadcasts a handover start message containing said MAC address of said acquired next access point;

30 said data forwarding controller
sets an entry in a MAC learning table as an additional

entry based on said MAC address of said next access point contained in said handover start message received from said communication terminal apparatus, wherein said additional entry sets a port to which said next access point is connected,
5 as an output port corresponding to a MAC address of said communication terminal apparatus; and

outputs data addressed to said MAC address of said communication terminal apparatus received via said network, in parallel to output ports listed in a plurality of entries
10 as to said MAC address of said communication terminal apparatus set in said MAC learning table, wherein said output ports are a plurality of ports to which a current access point and said next access point of said communication terminal apparatus are connected.

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26. The data communication method according to claim 25, wherein

said communication terminal apparatus further performs a handover process on condition that said
20 communication terminal apparatus receives a handover setting completion message from said data forwarding controller as a response to said handover start message.

27. The data communication method according to claim 25,
25 wherein

said data forwarding controller further transmits a handover setting completion message to said communication terminal apparatus from which said handover start message is received, on condition that said setting of
30 said additional entry in said MAC learning table based on said handover start message is completed.

28. The data communication method according to claim 25,
wherein

said data forwarding controller further
5 deletes, based on a MAC address of an old access point
contained in a handover end message received from said
communication terminal apparatus, an entry setting a port to
which said old access point is connected, as an output port
corresponding to said MAC address of said communication
10 terminal apparatus, from said MAC learning table.

29. A computer program described for executing a data
forwarding controlling process via a network on a computer
system, said computer program comprising the steps of:

15 setting, for a mobile node, in a MAC learning table in
which a MAC address of data for forwarding is associated with
an output port, a plurality of entries associating different
output ports with a MAC address of said mobile node; and

20 outputting data addressed to said MAC address of said
mobile node received via said network, to said plurality of
output ports in parallel based on said plurality of entries
set in said MAC learning table.

30. A computer program described for executing a handover
25 process on a computer system performed by a communication
terminal apparatus of a mobile type which performs data
transmission/reception via a network and which changes access
points based on data receiving conditions, said computer
program comprising the steps of:

30 acquiring a MAC address of a next access point to which
said communication terminal apparatus is scheduled to be

connected next;

**broadcasting a handover start message containing said
acquired MAC address of said next access point; and**

**5 performing said handover process on condition that a
handover setting completion message is received from a data
forwarding controller as a response to said handover start
message.**